

# How Engineer Wilgus Proposes to Extend Monument Avenue

## WILGUS FAVORS PLAN FOR DEPRESSING TRACKS

Expert Secured by The Times-Dispatch on Belt Line Situation Submits His Views.

REVIEWS PROPOSED PLANS

After Careful Study of Topography, Engineer Favors Moderate Depression of Railroad, With Slight Elevation of Street at Crossing.

Neither the practice of elevating or depressing tracks to eliminate grade crossings has the exclusive stamp of accepted usage in modern engineering practice, according to Engineer William J. Wilgus, of New York, the expert secured by The Times-Dispatch to examine the West End situation and report his views as to the best solution of the Belt Line problem.

Topography and local conditions, he holds, are the determining factors in dictating the best plan for relief. After making a careful study of the Belt Line problem in this city, he recommends as the best solution a moderate depression of the tracks, summarizing his findings in the following report:

December 18, 1915.  
Richmond Times-Dispatch, Richmond, Va.

Gentlemen.—In accordance with your request, I have looked over the Belt Line problem in your city, with a view to expressing to you my opinion of the relative merits of the various plans which have been offered for its solution. As an aid to a full understanding of the subject, it may be well briefly to outline the general situation.

### REVIEWS MAIN FEATURES OF TOPOGRAPHICAL SITUATION

To the west of Richmond, and ideally suited to the residential expansion of the city, lies a slightly high plateau, bounded on the north by the main line of the Richmond, Fredericksburg and Potomac Railroad and on the south by a bridge which drops abruptly to the waters of the James River. Traversing this plain at right angles is the Belt Line Railroad, which climbs to the surface on slightly rising gradients from the junction with the Richmond, Fredericksburg and Potomac Railroad at Acca to the summit near Cary Street, a distance of a mile or more, and thence for an equal distance sharply descends in deep cuttings at the rate of thirty-two feet per mile to a high level crossing of the James River.

Intersecting the Belt Line Railroad are four streets, reaching to and beyond the city limits, two of which pass over the tracks on bridges and two at grade. Eight additional streets are projected as extensions of Richmond's thoroughfares, of which the principal one, Monument Avenue, is 140 feet wide. It will thus be seen that the Belt Line Railroad lies directly in the path of the city's westward expansion, and that the continued presence of its tracks on the surface is a menace to public safety at the existing grade crossings and a block to the civic development of the city.

### FUNDAMENTAL METHODS REVIEWED IN DETAIL

For the purpose of removing this obstacle to the community's growth, two fundamental methods are open for consideration. Either the tracks may be raised so that the existing and proposed streets will pass beneath them, or they may be depressed so that the streets will pass over.

Neither method can be said to have the exclusive stamp of accepted usage in modern engineering practice, as local conditions, such as the surrounding topography, usually dictate the one best suited for adoption in each particular case. For instance, the track elevation method has been selected in many communities, such as Wilmington, Chester, Philadelphia, Elizabeth and Newark on the Pennsylvania Railroad; Albany, Schenectady and Rochester on the New York Central Railroad; Worcester and Springfield on the Boston and Albany Railroad, and in the city of Chicago. Illustrations of the track-depression method may be found at Baltimore, Brooklyn and at the New, near Boston, while the use of both the elevation and depression methods is in vogue in various sections of large cities like New York, Philadelphia, Boston, Buffalo and Detroit.

Therefore, the selection of the proper solution of the Belt Line problem at Richmond need not be hampered by adherence to practice followed elsewhere. Local conditions alone should govern. Mention has been made of the possibility of utilizing electric motive power as an aid to the working out of a satisfactory plan, but this has been done only in places where the enormous expense has been justified by great density of traffic, a condition which is understood not to obtain in this case.

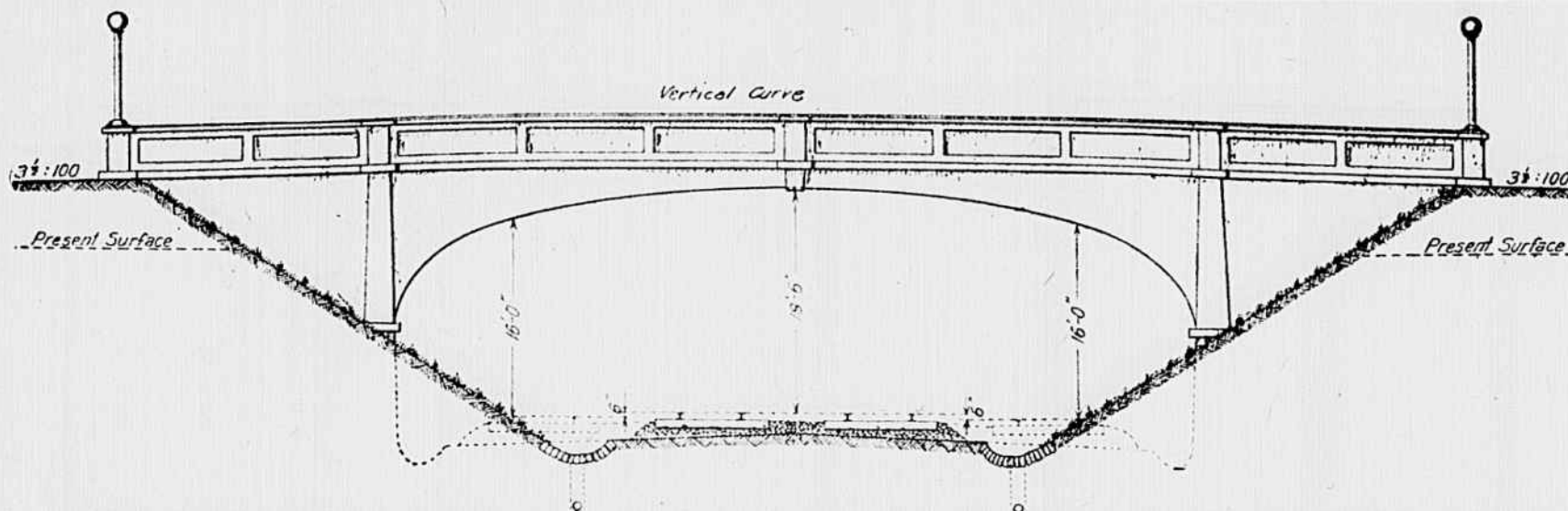
Both of the fundamental methods thus outlined have been proposed for the solution of this problem, the railroad company offering an elevation scheme, or, in lieu thereof, a moderate depression of tracks known as the Myers plan, and the city contending for a more radical depression termed the Hankins plan.

### ELEVATION SCHEME AND ITS OBJECTIONS

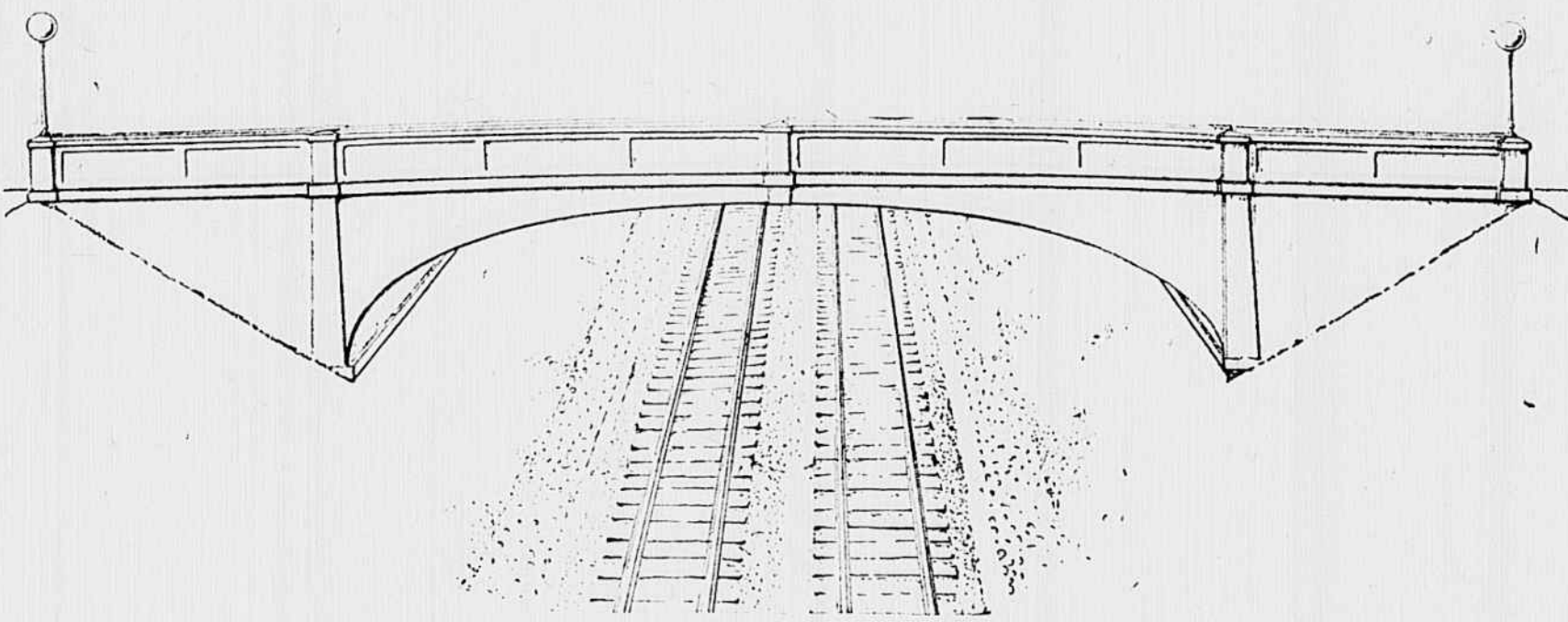
The elevation scheme contemplates the raising of the tracks between Louisa Avenue and Cary Street in such manner that the intervening thoroughfares, both existing and proposed, may dip beneath with cuttings of various depths below the surface to afford the required headroom of fourteen feet.

The objections to this plan are: (a) the erection of a lofty embankment injurious to a highly attractive residential section; (b) added nuisance from locomotive smoke and noise incident to the surmounting of the new approach gradients; (c) the uneconomical expenditure of fuel for lifting trains in both directions over the hump thus to be created; (d) the raising of the street grades at the crossings, some of which, as for instance, at Grove Street, would be extreme, and (e) the need for immediate investment in creating openings in the proposed embankment for all of the projected crossings, many of which may not be required for several years.

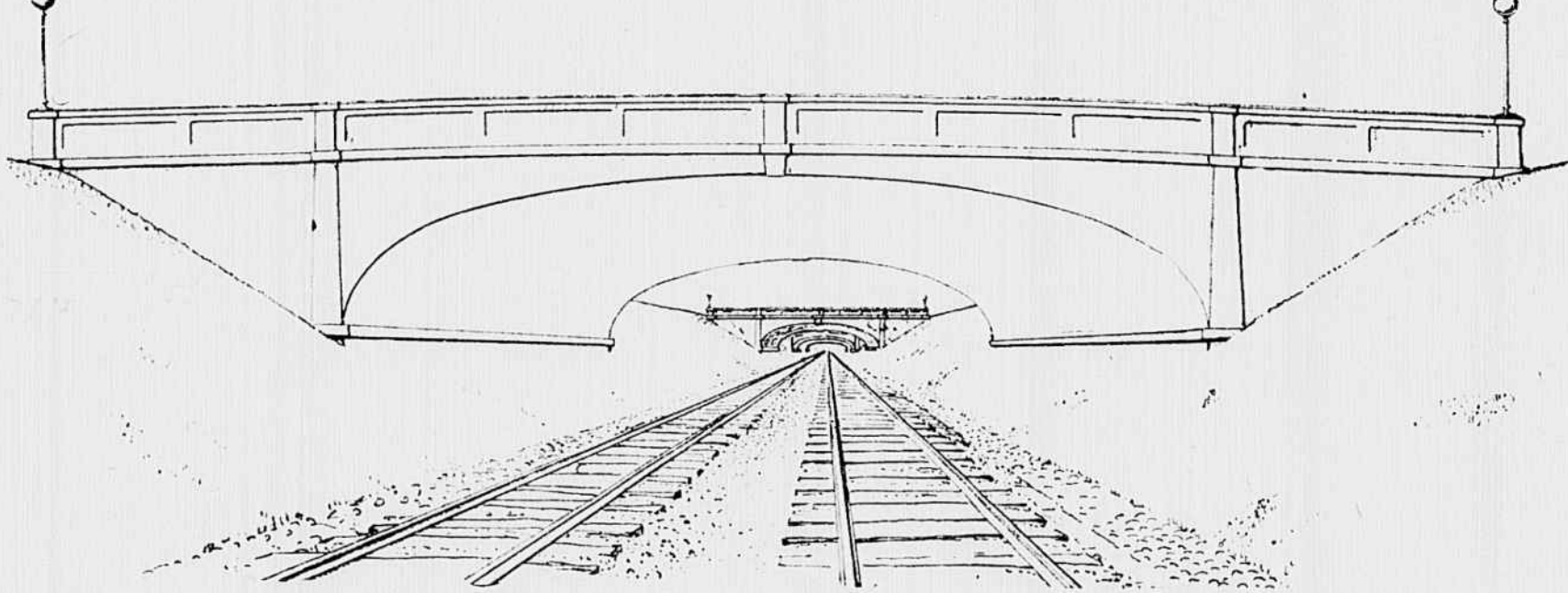
These objections point to the wisdom of seeking a better solution through the depression, rather than the elevation, of the tracks, and added weight is given to this view from the fact that



Bridge proposed by The Times-Dispatch expert for the extension of West End avenues. Note arch of bridge and reduced clearance space and slight vertical curve of roadway. The center of the bridge is intended to mark an eminence in the roadway of Monument Avenue similar to those at the location of the Robert E. Lee and Jefferson Davis monuments.



View of track depression for Belt Line Railroad. It is suggested that banks be sodded, and that bridges be of rough construction, so that ivy or other vines can be used for decorative effect.



Bird's-eye view up Belt Line tracks, showing succession of light concrete bridges carrying West End streets over railroad line practically at grade. In his plan for depressing the tracks of the Belt Line Railroad, and for the extension of Monument Avenue and other West End thoroughfares the streets. By these means he solves the problem of drainage in the railroad cut, and greatly reduces the cost of the entire construction from the first proposition of a through down-grade from Acca Yards to James River.

### DEPRESSION SCHEME ON HANKINS PLAN

The more radical, or Hankins, plan in the attainment of the desired end by carrying the streets over the tracks without material departure from the normal surface of the country, provides for a depression of tracks at the crossings of at least twenty-four feet. To avoid a nondrainable pocket this, in turn, has necessitated the adoption of a southward, continuously descending gradient from a point near the north end of the line all the way to the James River, thereby reversing the natural course of the drainage, with cuttings of over fifty feet in depth at the summit, and entailing the rebuilding of the entire length of three miles of road at an excessive cost. Moreover, the long gradient so imposed, a little over one inch per 100 feet, is so light that storm water and seepage would drain away sluggishly, and in consequence induce slides and poor track surface.

All of these disadvantages might be more than offset by increased economy of operation of the railroad over the reduced gradient, provided the volume of traffic and the length of the engine runs so warranted, but this is understood not to be the case.

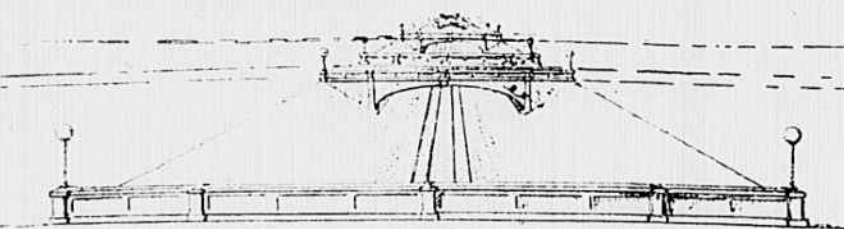
### DEPRESSION SCHEME ON MYERS' PLAN

The less radical of the two depression schemes, the Myers plan, evidently is based on the maximum lowering of tracks consistent with the retention of the drainage in its normal northerly course, thus avoiding the excessive cost of lowering the long approach in the deep cuttings between the summit and the James River. Unfortunately, as planned, this partial depression, averaging twelve feet, has involved the raising of the intersecting streets some twelve feet or more in order that the clearance between the top of rails and the underside of the street bridges may be fixed at twenty-one feet.

To this plan there is serious objection on the part of the city's representative, who considers that the raising of the streets above the natural level of the country will be detrimental to the community.

### SUGGESTED MODIFICATIONS IN PLANS PROPOSED

The many objectionable features of the elevation plan and the costliness and undesirability from several standpoints of the radical depression scheme prompt the suggestion that careful consideration be given to the partial depression plan in an endeavor to



Engineer Wilgus shows how West End avenues can be carried over the Belt Line tracks, approximately at grade, and at the same time solves the problem of drainage in the cut.

be more in harmony with the intended park-like development of the locality. A roughened surface covered with vines would cause bridges of this order to be ornaments in the landscape rather than eyesores. While their cost would be somewhat greater than the utilitarian type and would require an additional two-foot raise of the street surface—say six to seven feet in all—the advantages are so patent that the required small sacrifice would seem to be amply justified.

The claim is made by many that any raise whatever in the street surface is to be condemned, but this may possibly arise from a misconception of the effect of a moderate ascent at the railroad crossings, say six or seven feet. By utilizing the material from the railroad excavation it would be possible, with the consent of the neighboring landowners, to lift the entire adjoining surface for the full height at the right-of-way lines and sloped off for 150 to 200 feet each way.

The reduction in clear height from twenty-one to sixteen feet, the thinning of the bridge floors to two feet instead of three, as now proposed, and the further lowering of the tracks a foot or two, coupled with the deepening of the drainage courses on the north, would effect a lessening in the street raising of seven or eight feet, thus making the lift at Monument Avenue four or five feet instead of twelve feet, as planned.

These figures are predicated on the use of the trestle type of bridges now employed on the Belt Line. These structures, while of utilitarian merit, are not pleasing to the aesthetic sense, and would seem to be improper for extended application in a residential region that promises to play so large a part in the future of the city. An arch design of reinforced concrete, of which a study is attached, would

in such manner as to create a natural undulation or rise in the country. That a moderate swell in the surface might be a distinct attraction and serve to break the monotony of a flat expanse, may be seen by noting the happy effect that has been obtained on Monument Avenue by placing the Statues of Lee and Davis on slight eminences, where their silhouettes against the sky and the mystery of what lies beyond greatly enhance the beauty of the avenue.

It should be added that the sodding of the sides of the railroad cut, the underdraining and paving of the ditches and the cultivation of vines to clothe the bridges will go far to make the entire improvement a pleasing one.

### CONCLUSIONS ARRIVED AT AFTER CAREFUL STUDY

In the light of the situation as thus set forth it appears to me that the common interests of both the city and the railroad may be best served by the adoption of the less radical of the two depression plans, coupled with a

ROUND TRIP CHRISTMAS TICKETS Via Norfolk and Western Railway On sale to-day, and each day from now until December 25, inclusive, good for return passage until January 16.

### DEATHS

GRAHAM.—Died, at his residence, 713 Chamberlayne Avenue, Glinter Park, last night at 10:45 o'clock, WILLIAM CALDER GRAHAM, sixty-five years old. He is survived by his wife and seven children. Funeral notice later.

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reduction of the track clearance, a thinning of the bridge floors and the adjustment of the track gradients so as to restrict the raising of the principal streets to, say six or seven feet. The following of this course, illumined by careful attention to landscape effects and bridge design, should, in my opinion, result in a noteworthy addition to the attraction of Richmond.

Respectfully submitted,  
(Signed) WILLIAM J. WILGUS.

### TRACK DEPRESSION FAVORED BY EXPERT

(Continued from First Page.)

sent to the Council Street Committee to-morrow night by Chairman Gilbert K. Pollock. It will be an important contribution to the committee's information on the troubling Belt Line situation, and, coming from an engineer who has achieved national prominence in dealing with major construction problems in an active experience of thirty years, will have its effect on the ultimate solution of the problem. A large attendance of interested citizens is expected at the meeting at the City Hall to-morrow night, when the Belt Line plans will be considered.

### ADVICE OF OUTSIDE EXPERT DESIRABLE

Under conditions as they existed at the time this paper decided to call in Mr. Wilgus, it appeared unlikely that the city would make the appropriation necessary for the employment of a disinterested expert. West End interests and the city at large were pressing for an immediate adjustment of the Belt Line controversy. While the Street Committee unofficially approved the idea of calling in an expert adviser, and the press of the city practically without division advised such a course, no step in this direction was taken or seemed probable to be taken.

With this the state of affairs, The Times-Dispatch undertook to provide the expert adviser that the city wanted, but which there was no machinery to employ. It at once enlisted the aid of Mr. Wilgus, known wherever engineers meet as an expert of the first rank, who cheerfully and promptly undertook the task. In his New York office he made a study of the several plans suggested for the treatment of the Belt Line problem, and early last week he came to the city to make a personal inspection of the situation.

### EXAMINED PLANS ON FILE IN ENGINEER'S OFFICE

While in the city he examined the plans and elevations on file in the City Engineer's office and paced the Belt Line right of way on foot examining in detail the topography of the country. Having already made a study of the railroad's plans before he came to the city, he found no occasion to discuss with the railroad engineers in the local office the suggestions advanced by them, departing from the offices of Richmond, Fredericksburg and Potomac Railroad Company.

Mr. Wilgus's conclusions as to the proper manner of dealing with the Belt Line situation carry the imprint of authority gained from a life-work devoted to engineering problems of a similar nature. For fourteen years Mr. Wilgus was associated in a directing capacity with the major engineering operations of the New York Central and Hudson River Railroad. As chief engineer and vice-president of that system, he was in charge of the reconstruction and enlargement of terminals and bridges, including the initiation and construction of the Grand Central Station in New York City. Since 1908 he has been in private practice in New York.

Mr. Wilgus was chairman of the advisory board of engineers for the construction of the tunnel under the Detroit River, connecting the Michigan Central and the Canadian Southern, a project including the construction of the Union Station, at Detroit, involving an expenditure of \$15,000,000.

Most of Mr. Wilgus's operations have had to do with the adjustment of problems similar to the one that Richmond now faces in the West End. Every union station project that he has supervised—notably the construction of the station at Buffalo, which was under his direction—involved the elimination of grade crossings, either by the expedient of elevating or depressing tracks.

Mr. Wilgus is a member of the American Society of Civil Engineers, of the Institute of Civil Engineering of London, England, of the American Railway Engineering Association, and of other professional organizations in this country and abroad. He is the author of numerous technical papers and reports.

### CONCLUSION SIMILAR TO VIEWS OF HARRY FRAZIER

In the light of recent progress of conferences between Henry P. Beck, of the Administrative Board, and Consulting Engineer Harry Frazier, representing the railroad company, looking to the adoption of a mutually acceptable plan which shall provide for a modified depression of the Belt Line tracks on the lines suggested by the so-called Myers plan, the conclusion reached by Mr. Wilgus is particularly significant and valuable.

The new modified plan was presented to Mr. Beck last week by Mr. Frazier, and was regarded by the latter as promising enough to warrant consideration at the hands of the Street Committee. Engineer Frazier, of the city forces, has been at work on drawings illustrating Mr. Frazier's suggestions, and these, together with a statement of the new scheme, will be presented to the committee to-morrow night.

The Frazier plan, in a general way, approximates the solution that is suggested by Engineer Wilgus. The fact that Mr. Frazier, who was formerly chief engineer for the Chesapeake and Ohio Railway Company, and Mr. Wilgus had no conference, but pursued their studies on independent lines, renders doubly significant the fact that they have arrived at approximately the same conclusions.

With both of these engineers practically agreed as to the best plan for dealing with the Belt Line difficulty—one of them, Mr. Wilgus, a disinterested expert, with no personal interest in the ultimate solution—the committee will have before it to-morrow night expert advice the quality of which will be unassailable, and which will probably mean the early and prompt adjustment of the problem which has confronted the city in the West End for the past five years.

### FOR EMPTY STOCKINGS

Christmas Tree Committee Asks Donations to Aid in Caring for Those Santa Claus Overlooks.

The Community Christmas Tree Committee is making an especial appeal for the poor children of the city, who, if those more fortunate circumstances do not come to their help, will awaken Christmas morning and find that Santa Claus has forgotten them, that their stockings are empty. To avert such a tragedy, for there is no sorrow so poignant as that of a disappointed child, the committee asks that those who can contribute send confections, fruit and nuts and donate cash funds. Contributions may be sent to D. W. Durrett, treasurer, in care of the American National Bank, or to Mrs. F. M. Reade, 2901 West Grace Street.

The tree was put in position yesterday, and the work of stringing the wires and placing the electric bulbs was begun at once.

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